What is claimed is:

1. An isolated nucleic acid encoding a chimeric G protein, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted or varies therefrom by no more than five amino acids, provided that at least five of the C-terminal amino acids of the chimeric G protein are present at the C-terminus of such vertebrate G protein.

2. A nucleic acid of claim 1, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted or varies therefrom by no more than two amino acids, provided that at least five of the C-terminal amino acids of the chimeric G protein are present at the C-terminus of such vertebrate G protein.

3. A nucleic acid of claim 1, wherein the chimeric G protein comprises an invertebrate Gαq G protein

from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

4. The nucleic acid of claim 1, wherein the nucleic acid is DNA.

5. The nucleic acid of claim 4, wherein the DNA is cDNA.

6. The nucleic acid of claim 4, wherein the DNA is genomic DNA.

7. The nucleic acid of claim 1, wherein the nucleic acid is RNA.

8. The nucleic acid of claim 1, wherein the vertebrate G protein is a mammalian G protein.

9. The nucleic acid of claim 1, wherein the contiguous amino acids which have been deleted are contained in FVFAAVKDTILQHNLKEYNLV* (SEQ ID NO: 37), wherein V* is the C-terminal amino acid.

10. The nucleic acid of claim 1, wherein the vertebrate G protein is a vertebrate Gαz G protein.

11. The nucleic acid of claim 10, wherein the number of contiguous amino acids which have replaced the deleted amino acids are contained in

FVFDAVTDVIIQNNLKYIGLC* (SEQ ID NO: 38), wherein C* is the C-terminal amino acid.

12. The nucleic acid of claim 10, wherein the invertebrate Gαq G protein has five contiguous amino acids beginning with the C-terminal amino acid which have been deleted and replaced by five contiguous amino acids beginning with the C-terminal amino acid of the vertebrate Gαz protein.

13. The nucleic acid of claim 1, wherein the vertebrate G protein is a vertebrate Gαs G protein.

14. The nucleic acid of claim 13, wherein the number of contiguous amino acids which have replaced the deleted amino acids are contained in RVFNDCRDIIQRMHLRQYELL* (SEQ ID NO: 39), wherein L* is the C-terminal amino acid.

15. The nucleic acid of claim 13, wherein the invertebrate Gαq G protein has nine contiguous amino acids beginning with the C-terminal amino acid which have been deleted and replaced by nine contiguous amino acids beginning with the C-terminal amino acid of the vertebrate Gαs protein.

16. The nucleic acid of claim 1, wherein the vertebrate G protein is a vertebrate Gαi3 G protein.

17. The nucleic acid of claim 16, wherein the number of contiguous amino acids which have replaced the

deleted amino acids are contained in FVFDAVTDVIIKNNLKECGLY* (SEQ ID NO: 40), wherein Y* is the C-terminal amino acid.

18. The nucleic acid of claim 16, wherein the invertebrate Gαq G protein has five contiguous amino acids beginning with the C-terminal amino acid which have been deleted and replaced by five contiguous amino acids beginning with the C-terminal amino acid of the vertebrate Gαi3 protein.

19. The nucleic acid of claim 1, wherein the vertebrate G protein is a vertebrate Gαi1 G protein, a vertebrate Gαi2 G protein, a vertebrate GαoA G protein, or a vertebrate GαoB G protein.

20. The nucleic acid of claim 1, wherein the invertebrate Gαq G protein is a *Caenorhabditis elegans* Gαq G protein.

21. The nucleic acid of claim 1, wherein the invertebrate Gαq G protein is a *Drosophila melanogaster* Gαq G protein, a *Limulus polyphemus* Gαq G protein, a *Patinopecten yessoensis* Gαq G protein, a *Loligo forbesi* Gαq G protein, a *Homarus americanus* Gαq G protein, a *Lymnaea stagnalis* Gαq G protein, a *Geodia cydonium* Gαq G protein, or a *Dictyostelium discoideum* $G\alpha_4$ G protein.

22. The nucleic acid of claim 1, wherein the chimeric G protein has an amino acid sequence substantially the same as the amino acid sequence shown in (a) Figure 2, *C. elegans* $G\alpha_{q/z5}$ (SEQ ID NO: 1); (b) Figure 2, *C. elegans* $G\alpha_{q/z9}$ (SEQ ID NO: 2); (c) Figure 2, *C. elegans* $G\alpha_{q/s9}$ (SEQ ID NO: 3); (d) Figure 2, *C. elegans* $G\alpha_{q/s21}$ (SEQ ID NO: 4); (e) Figure 2, *C. elegans* $G\alpha_{q/i3(5)}$ (SEQ ID NO: 5); or (f) Figure 2, *D. melaongaster* $G\alpha_{q/zs}$ (SEQ ID NO: 41).

23. A vector comprising the nucleic acid of claim 1.

24. A vector of claim 23 adapted for expression in a cell which comprises the regulatory elements necessary for expression of the nucleic acid in the cell operatively linked to the nucleic acid encoding the chimeric G protein so as to permit expression thereof, wherein the cell is a bacterial, amphibian, yeast, insect, or mammalian cell.

25. The vector of claim 24, wherein the vector is a plasmid, a baculovirus, or a retrovirus.

26. A cell comprising the vector of claim 23, wherein the cell comprises DNA encoding a mammalian G protein-coupled receptor.

27. A cell of claim 26, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

28. A cell of claim 26, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

29. A cell of claim 26, wherein the cell is a non-mammalian cell.

30. A cell of claim 29, wherein the non-mammalian cell is a *Xenopus* oocyte cell or a *Xenopus* melanophore cell.

31. A cell of claim 26, wherein the cell is a mammalian cell.

32. A mammalian cell of claim 31, wherein the cell is a COS-7 cell, a 293 human embryonic kidney cell, a NIH-3T3 cell, a LM(tk-) cell, a mouse Y1 cell, or a CHO cell.

33. A cell of claim 26, wherein the cell is an insect cell.

34. An insect cell of claim 33, wherein the insect cell is an Sf9 cell, an Sf21 cell or a Trichoplusia *ni* 5B-4 cell.

35. A membrane preparation isolated from the cell of any one of claims 26, 27, 28, 29, 31, 32, 33 or 34.

36. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor agonist which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the

compound under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting an increase in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound is a mammalian G protein-coupled receptor agonist.

37. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor agonist which comprises contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the compound under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting an increase in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound is a mammalian G protein-coupled receptor agonist.

38. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor antagonist which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the compound in the presence of a known mammalian G protein-coupled receptor agonist, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting a decrease in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound is a mammalian G protein-coupled receptor antagonist.

39. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor antagonist which comprises contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the compound in the presence of a known mammalian G protein-coupled receptor agonist, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting a decrease in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound is a mammalian G protein-coupled receptor antagonist.

40. The process of claim 36, 37, 38, or 39, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

41. The process of claim 36, 37, 38, or 39, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

42. The process of claim 36, 37, 38, or 39, wherein the mammalian G protein-coupled receptor is a human Y5 receptor, a human GALR2 receptor, a human kappa opioid receptor, a human NPFF1 receptor, a human NPFF2 receptor, a human α2A adrenergic receptor, a human dopamine D2 receptor, a human GALR1 receptor, a human Y2 receptor, a human Y1 receptor, a human Y4 receptor, a human α1A adrenergic receptor, a human dopamine D1 receptor, or a rat NTR1 receptor.

43. A process for determining whether a chemical compound specifically binds to and activates a mammalian G protein-coupled receptor, which comprises contacting cells producing a second messenger response, expressing the DNA encoding the mammalian G protein-coupled receptor, and expressing the DNA encoding a chimeric G protein, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the chemical compound under conditions suitable for activation of the mammalian G protein-coupled receptor, and measuring the second messenger response in the presence and in the absence of the chemical compound, a change in the second messenger response in the presence of the chemical compound indicating that the compound activates the mammalian G protein-coupled receptor.

44. The process of claim 43, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

45. The process of claim 43, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

46. The process of claim 43, wherein the second messenger response is the detection of a reporter protein under the transcriptional control of a promoter element.

47. The process of claim 43, wherein the second messenger response is measured by a change in cell proliferation.

48. The process of claim 43, wherein the second messenger response is a Gαq second messenger response.

49. The process of claim 48, wherein the Gαq second messenger response comprises release of inositol phosphate and the change in second messenger is an increase in the level of inositol phosphate.

50. The process of claim 48, wherein the Gαq second messenger response comprises release of arachidonic acid and the change in second messenger is an increase in the level of arachidonic acid.

51. The process of claim 48, wherein the Gαq second messenger response comprises activation of MAP kinase and the change in second messenger response is an increase in MAP kinase activation.

52. The process of claim 48, wherein the Gαq second messenger response comprises intracellular calcium levels and the change in second messenger is an increase in the measure of intracellular calcium.

53. The process of claim 52, wherein the measure of intracellular calcium levels is made by chloride current readings.

54. The process of claim 52, wherein the measure of intracellular calcium is made by fluorescence readings, luminescence readings, electrophysiological readings, or through the

detection of a reporter protein under the transcriptional control of a calcium-responsive promoter element.

55. A process for determining whether a chemical compound specifically binds to and inhibits activation of a mammalian G protein-coupled receptor, which comprises separately contacting cells producing a second messenger response, expressing the DNA encoding the mammalian G protein-coupled receptor, and expressing the DNA encoding a chimeric G protein, wherein such cells do not normally express the DNA encoding the chimeric G protein, with both the chemical compound and a second chemical compound known to activate the mammalian G protein-coupled receptor, and with only the second chemical compound, under conditions suitable for activation of the mammalian G protein-coupled receptor, and measuring the second messenger response in the presence of only the second chemical compound and in the presence of both the second chemical compound and the chemical compound, a smaller change in the second messenger response in the presence of both the chemical compound and the second chemical compound than in the presence of only the second chemical compound indicating that the chemical compound inhibits activation of the mammalian G protein-coupled receptor.

56. The process of claim 55, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

57. The process of claim 55, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

58. The process of claim 55, wherein the second messenger response is the detection of a reporter protein under the transcriptional control of a promoter element.

59. The process of claim 55, wherein the second messenger response is measured by a change in cell proliferation.

60. The process of claim 55, wherein the second messenger response is a Gαq second messenger response.

61. The process of claim 60, wherein the Gαq second messenger response comprises release of inositol phosphate and the change in second messenger response is a smaller increase in the level of inositol phosphate in the presence of both the chemical compound and the second chemical compound than in the presence of only the second chemical compound.

62. The process of claim 60, wherein the Gαq second messenger response comprises activation of MAP kinase and the change in second messenger response is a smaller increase in the level of MAP kinase activation in the presence of both the chemical compound and the second chemical compound than in the presence of only the second chemical compound.

63. The process of claim 60, wherein the Gαq second messenger response comprises release of arachidonic acid and the change in second messenger response is an increase in the level of arachidonic acid levels in the presence of both the chemical compound and the second chemical compound than in the presence of only the second chemical compound.

64. The process of claim 60, wherein the Gαq second messenger response comprises change in intracellular calcium levels and the change in second messenger response is a smaller increase in the measure of intracellular calcium in the presence of both the chemical compound and the second chemical compound than in the presence of only the second chemical compound.

65. The process of claim 64, wherein the measure of intracellular calcium levels is made by chloride current readings.

66. The process of claim 64, wherein the measure of intracellular calcium is made by fluorescence readings, luminescence readings, electrophysiological readings, or through the detection of a reporter protein under the transcriptional control of a calcium-responsive promoter element.

67. A process of screening a plurality of chemical compounds not known to activate a mammalian G protein-coupled receptor to identify a compound which activates the mammalian G protein-coupled receptor which comprises:

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with the plurality of compounds not known to activate the mammalian G protein-coupled receptor, under conditions permitting activation of the mammalian G protein-coupled receptor;

(b) determining whether the activity of the mammalian G protein-coupled receptor is increased in the presence of one or more of the compounds; and if so

(c) separately determining whether the activation of the mammalian G protein-coupled receptor is increased by any compound included in the plurality of compounds, so as to thereby identify each compound which activates the mammalian G protein-coupled receptor.

68. A process of screening a plurality of chemical compounds not known to inhibit the activation of a mammalian G protein-coupled receptor to identify a compound which inhibits the activation of the mammalian G protein-coupled receptor, which comprises:

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with the plurality of compounds in the presence of a known mammalian G protein-coupled

receptor agonist, under conditions permitting activation of the mammalian G protein-coupled receptor;

(b) determining whether the extent or amount of activation of the mammalian G protein-coupled receptor is reduced in the presence of one or more of the compounds, relative to the extent or amount of activation of the mammalian G protein-coupled receptor in the absence of such one or more compounds; and if so

(c) separately determining whether each such compound inhibits activation of the mammalian G protein-coupled receptor for each compound included in the plurality of compounds, so as to thereby identify any compound included in such plurality of compounds which inhibits the activation of the mammalian G protein-coupled receptor.

69. The process of claim 67 or 68, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

70. The process of claim 67 or 68, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

71. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor agonist, which comprises separately contacting membrane preparations from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a

mammalian G protein-coupled receptor with both the compound and [$^{35}$S]GTPγS, and with only [$^{35}$S]GTPγS, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting [$^{35}$S]GTPγS binding to the membrane preparation and an increase in [$^{35}$S]GTPγS binding in the presence of the compound indicating that the chemical compound activates the mammalian G protein-coupled receptor.

72. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor antagonist which comprises separately contacting membrane preparations from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with the chemical compound, [$^{35}$S]GTPγS, and a second chemical compound known to activate the mammalian G protein-coupled receptor, with [$^{35}$S]GTPγS and only the second compound, and with [$^{35}$S]GTPγS alone, under conditions permitting the activation of the mammalian G protein-coupled receptor, detecting [$^{35}$S]GTPγS binding to each membrane preparation, comparing the increase in [$^{35}$S]GTPγS binding in the presence of the compound and the second compound relative to the binding of [$^{35}$S]GTPγS alone to the increase in [$^{35}$S]GTPγS binding in the presence of the second chemical compound relative to the binding of [$^{35}$S]GTPγS alone, and detecting a smaller increase in [$^{35}$S]GTPγS binding in the presence of the compound and the second compound indicating that the compound is a mammalian G protein-coupled receptor antagonist.

73. The process of claim 71 or 72, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

74. The process of claim 71 or 72, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

75. The process of claim 71 or 72, wherein the mammalian G protein-coupled receptor produces a Gαs second messenger response in the absence of the chimeric G protein.

76. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor agonist, which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with a compound, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting changes in receptor active state conformation as manifested by changes in receptor/G protein heterotrimer association/dissociation in the presence of the compound indicating that the chemical compound activates the mammalian G protein-coupled receptor.

77. A process for determining whether a chemical compound is a mammalian G protein-coupled receptor antagonist which comprises separately contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled

receptor with the chemical compound in the presence of a known mammalian G protein-coupled receptor agonist, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting changes in receptor active state conformation as manifested by changes in receptor/G protein heterotrimer association/dissociation in the presence of the compound indicating that the compound is a mammalian G protein-coupled receptor antagonist.

78. The process of claim 76 or 77, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

79. The process of claim 76 or 77, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

80. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

81. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning

with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαz protein beginning with the C-terminal amino acid of such vertebrate Gαz protein, wherein such number equals the number of amino acids deleted.

82. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαs protein beginning with the C-terminal amino acid of such vertebrate Gαs protein, wherein such number equals the number of amino acids deleted.

83. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαi3 protein beginning with the C-terminal amino acid of such vertebrate Gαi3 protein, wherein such number equals the number of amino acids deleted.

84. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises a *Caenorhabditis elegans* Gαq G protein from which at least five,

but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

85. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein comprises a *Drosophila melanogaster* Gαq G protein, a *Limulus polyphemus* Gαq G protein, a *Patinopecten yessoensis* Gαq G protein, a *Loligo forbesi* Gαq G protein, a *Homarus americanus* Gαq G protein, a *Lymnaea stagnalis* Gαq G protein, a *Geodia cydonium* Gαq G protein, or a *Dictyostelium discoideum* $G\alpha_4$ G protein, from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of a vertebrate G protein, wherein such number equals the number of amino acids deleted.

86. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the chimeric G protein has an amino acid sequence substantially the same as the amino acid sequence shown in (a) Figure 2, *C. elegans* $G\alpha_{q/z5}$ (SEQ ID NO: 1); (b) Figure 2, *C. elegans* $G\alpha_{q/z9}$ (SEQ ID NO: 2); (c) Figure 2, *C. elegans* $G\alpha_{q/s9}$ (SEQ ID NO: 3); (d) Figure 2, *C. elegans* $G\alpha_{q/s21}$ (SEQ ID NO: 4); (e) Figure 2, *C. elegans* $G\alpha_{q/i3(5)}$ (SEQ ID

NO: 5); or (f) Figure 2, *D. melaongaster* $G\alpha_{q/zs}$ (SEQ ID NO: 41).

87. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the cell is an insect cell.

88. The process of any one of claims 36, 37, 38, 39, 43, 55, 67, 68, 71, 72, 76, or 77, wherein the cell is a mammalian cell.

89. The process of claim 88, wherein the cell is nonneuronal in origin.

90. The process of claim 89, wherein the nonneuronal cell is a COS-7 cell, 293 human embryonic kidney cell, a CHO cell, a NIH-3T3 cell, a mouse Y1 cell, or a LM(tk-) cell.

91. A process for identifying a chemical compound which specifically binds to a mammalian G protein-coupled receptor which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the compound under conditions suitable for binding, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor.

92. A process for identifying a chemical compound which specifically binds to a mammalian G protein-coupled receptor which comprises contacting a membrane preparation from cells

transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the compound under conditions suitable for binding, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor.

93. A process involving competitive binding for identifying a chemical compound which specifically binds to a mammalian G protein-coupled receptor which comprises separately contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with both the chemical compound and a second chemical compound known to bind to the mammalian G protein-coupled receptor, and with only the second chemical compound, under conditions suitable for binding of both compounds, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor, a decrease in the binding of the second chemical compound to the mammalian G protein-coupled receptor in the presence of the chemical compound indicating that the chemical compound binds to the mammalian G protein-coupled receptor.

94. A process involving competitive binding for identifying a chemical compound which specifically binds to a mammalian G protein-

coupled receptor which comprises separately contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with both the chemical compound and a second chemical compound known to bind to the receptor, and with only the second chemical compound, under conditions suitable for binding of both compounds, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor, a decrease in the binding of the second chemical compound to the mammalian G protein-coupled receptor in the presence of the chemical compound indicating that the chemical compound binds to the mammalian G protein-coupled receptor.

95. A process of screening a plurality of chemical compounds not known to bind to a mammalian G protein-coupled receptor to identify a compound which specifically binds to the mammalian G protein-coupled receptor, which comprises

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with a compound known to bind specifically to the mammalian G protein-coupled receptor;

(b) contacting the cells of step (a) with the plurality of compounds not known to

bind specifically to the mammalian G protein-coupled receptor, under conditions permitting binding of compounds known to bind to the mammalian G protein-coupled receptor;

(c) determining whether the binding of the compound known to bind to the mammalian G protein-coupled receptor is reduced in the presence of the plurality of compounds, relative to the binding of the compound in the absence of the plurality of compounds; and if so

(d) separately determining the binding to the mammalian G protein-coupled receptor of each compound included in the plurality of compounds, so as to thereby identify any compound included therein which specifically binds to the mammalian G protein-coupled receptor.

96. A process of screening a plurality of chemical compounds not known to bind to a mammalian G protein-coupled receptor to identify a compound which specifically binds to the mammalian G protein-coupled receptor, which comprises

(a) contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with the plurality of compounds not known to bind specifically to the mammalian G protein-coupled receptor under conditions

permitting binding of compounds known to bind to the mammalian G protein-coupled receptor;

(b) determining whether the binding of a compound known to bind to the mammalian G protein-coupled receptor is reduced in the presence of the plurality of compounds, relative to the binding of the compound in the absence of the plurality of compounds; and if so

(c) separately determining the binding to the mammalian G protein-coupled receptor of each compound included in the plurality of compounds, so as to thereby identify any compound included therein which specifically binds to the mammalian G protein-coupled receptor.

97. The process of claim 91, 92, 93, 94, 95, or 96, wherein the DNA encoding the mammalian G protein-coupled receptor is endogenous to the cell.

98. The process of claim 91, 92, 93, 94, 95, or 96, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

99. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with

the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

100. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαz protein beginning with the C-terminal amino acid of such vertebrate Gαz protein, wherein such number equals the number of amino acids deleted.

101. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαs protein beginning with the C-terminal amino acid of such vertebrate Gαs protein, wherein such number equals the number of amino acids deleted.

102. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids

present in a vertebrate Gαi3 protein beginning with the C-terminal amino acid of such vertebrate Gαi3 protein, wherein such number equals the number of amino acids deleted.

103. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises an *Caenorhabditis elegans* Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

104. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein comprises a *Drosophila melanogaster* Gαq G protein, a *Limulus polyphemus* Gαq G protein, a *Patinopecten yessoensis* Gαq G protein, a *Loligo forbesi* Gαq G protein, a *Homarus americanus* Gαq G protein, a *Lymnaea stagnalis* Gαq G protein, a *Geodia cydonium* Gαq G protein, or a *Dictyostelium discoideum* $G\alpha_4$ G protein, from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

105. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the chimeric G protein has an amino acid sequence substantially the same as the amino acid sequence shown in (a) Figure 2, *C. elegans* $G\alpha_{q/z5}$ (SEQ ID NO: 1); (b) Figure 2, *C. elegans* $G\alpha_{q/z9}$ (SEQ ID NO: 2); (c) Figure 2, *C. elegans* $G\alpha_{q/s9}$ (SEQ ID NO: 3); (d) Figure 2, *C. elegans* $G\alpha_{q/s21}$ (SEQ ID NO: 4); (e) Figure 2, *C. elegans* $G\alpha_{q/i3(5)}$ (SEQ ID NO: 5); or (f) Figure 2, *D. melaongaster* $G\alpha_{q/zs}$ (SEQ ID NO: 41).

106. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the cell is an insect cell.

107. The process of any one of claims 91, 92, 93, 94, 95, or 96, wherein the cell is a mammalian cell.

108. The process of claim 107, wherein the cell is nonneuronal in origin.

109. The process of claim 108, wherein the nonneuronal cell is a COS-7 cell, 293 human embryonic kidney cell, a CHO cell, a NIH-3T3 cell, a mouse Y1 cell, or a LM(tk-) cell.

110. The process for making a composition of matter which specifically binds to a mammalian G protein-coupled receptor which comprises identifying a chemical compound using the process of any of claims 36, 37, 43, 67, 71, or 76 and then synthesizing the chemical compound or a novel structural and functional analog or homolog thereof.

111. The process for making a composition of matter which specifically binds to a mammalian G protein-coupled receptor which comprises identifying a chemical compound using the process of any of claims 38, 39, 55, 68, 72, or 77 and then synthesizing the chemical compound or a novel structural and functional analog or homolog thereof.

112. The process for making a composition of matter which specifically binds to a mammalian G protein-coupled receptor which comprises identifying a chemical compound using the process of any of claims 91, 92, 93, 94, 95, or 96 and then synthesizing the chemical compound or a novel structural and functional analog or homolog thereof.

113. The process for preparing a composition which comprises admixing a carrier and a pharmaceutically effective amount of a chemical compound identified by the process of any of claims 36, 37, 43, 67, 71, or 76 or a novel structural and functional analog or homolog thereof.

114. The process for preparing a composition which comprises admixing a carrier and a pharmaceutically effective amount of a chemical compound identified by the process of any of claims 38, 39, 55, 68, 72, or 77 or a novel structural and functional analog or homolog thereof.

115. The process for preparing a composition which comprises admixing a carrier and a

pharmaceutically effective amount of a chemical compound identified by the process of any of claims 91, 92, 93, 94, 95, or 96 or a novel structural and functional analog or homolog thereof.

116. A process for determining whether a chemical compound is a ligand for a mammalian G protein-coupled receptor which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the compound under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting an increase in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound activates the mammalian G protein-coupled receptor and is a ligand for the mammalian G protein-coupled receptor.

117. A process for determining whether a chemical compound is a ligand for a mammalian G protein-coupled receptor which comprises contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, with the compound under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting an increase in mammalian G protein-coupled receptor activity, so as to thereby determine whether the compound activates the mammalian G protein-coupled receptor and is a ligand for the mammalian G protein-coupled receptor.

118. A process for determining whether a chemical compound is a ligand for a mammalian G protein-coupled receptor which comprises contacting cells producing a second messenger response, expressing the DNA encoding the mammalian G protein-coupled receptor, and expressing the DNA encoding a chimeric G protein, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the chemical compound under conditions suitable for activation of the mammalian G protein-coupled receptor, and measuring the second messenger response in the presence and in the absence of the chemical compound, a change in the second messenger response in the presence of the chemical compound indicating that the compound activates the mammalian G protein-coupled receptor and is a ligand for the mammalian G protein-coupled receptor.

119. The process of claim 118, wherein the second messenger response is a Gαq second messenger response.

120. The process of claim 119, wherein the Gαq second messenger response comprises intracellular calcium levels and the change in second messenger is an increase in the measure of intracellular calcium.

121. The process of claim 120, wherein the measure of intracellular calcium levels is made by chloride current readings.

122. The process of claim 120, wherein the measure of intracellular calcium is made by fluorescence readings, luminescence readings, electrophysiological readings, or through the detection of a reporter protein under the transcriptional control of a calcium-responsive promoter element.

123. A process of screening a plurality of chemical compounds not known to activate a mammalian G protein-coupled receptor to identify a ligand for the mammalian G protein-coupled receptor which comprises:

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with the plurality of compounds not known to activate the mammalian G protein-coupled receptor, under conditions permitting activation of the mammalian G protein-coupled receptor;

(b) determining whether the activity of the mammalian G protein-coupled receptor is increased in the presence of one or more of the compounds; and if so

(c) separately determining whether the activation of the mammalian G protein-coupled receptor is increased by any compound included in the plurality of compounds, so as to thereby identify each compound which activates the mammalian G protein-coupled receptor and is a ligand

for the mammalian G protein-coupled receptor.

124. A process for determining whether a chemical compound is a ligand for a mammalian G protein-coupled receptor, which comprises separately contacting membrane preparations from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with both the compound and [$^{35}$S]GTPγS, and with only [$^{35}$S]GTPγS, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting [$^{35}$S]GTPγS binding to the membrane preparation and an increase in [$^{35}$S]GTPγS binding in the presence of the compound indicating that the chemical compound activates the mammalian G protein-coupled receptor and is a ligand for the mammalian G protein-coupled receptor.

125. A process for determining whether a chemical compound is a ligand for the mammalian G protein-coupled receptor, which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor with a compound, under conditions permitting the activation of the mammalian G protein-coupled receptor, and detecting changes in receptor active state conformation as manifested by changes in receptor/G protein heterotrimer association/dissociation in the presence of the compound indicating that the chemical compound activates the mammalian G

protein-coupled receptor and is a ligand for the mammalian G protein-coupled receptor.

126. A process for identifying a ligand for a mammalian G protein-coupled receptor which comprises contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the compound under conditions suitable for binding, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor, indicating that the compound is a ligand for the mammalian G protein-coupled receptor.

127. A process for identifying a chemical compound which specifically binds to a mammalian G protein-coupled receptor which comprises contacting a membrane preparation from cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a mammalian G protein-coupled receptor, wherein such cells do not normally express the DNA encoding the chimeric G protein, with the compound under conditions suitable for binding, and detecting specific binding of the chemical compound to the mammalian G protein-coupled receptor, indicating that the compound is a ligand for the mammalian G protein-coupled receptor.

128. The process of claim 116, 117, 118, 123, 124, 125, 126, or 127, wherein the DNA encoding the

mammalian G protein-coupled receptor is endogenous to the cell.

129. The process of claim 116, 117, 118, 123, 124, 125, 126, or 127, wherein the DNA encoding the mammalian G protein-coupled receptor is transfected into the cell.

130. The process of any one claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

131. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαz protein beginning with the C-terminal amino acid of such vertebrate Gαz protein, wherein such number equals the number of amino acids deleted.

132. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric

G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαs protein beginning with the C-terminal amino acid of such vertebrate Gαs protein, wherein such number equals the number of amino acids deleted.

133. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gi3 protein beginning with the C-terminal amino acid of such vertebrate Gi3 protein, wherein such number equals the number of amino acids deleted.

134. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein comprises an *Caenorhabditis elegans* Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

135. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein comprises a *Drosophila melanogaster* Gαq G protein, a *Limulus polyphemus* Gαq G protein, a *Patinopecten yessoensis* Gαq G protein, a *Loligo forbesi* Gαq G protein, a *Homarus americanus* Gαq G protein, a *Lymnaea stagnalis* Gαq G protein, a *Geodia cydonium* Gαq G protein, or a *Dictyostelium discoideum* $G\alpha_4$ G protein, from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

136. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the chimeric G protein has an amino acid sequence substantially the same as the amino acid sequence shown in (a) Figure 2, *C. elegans* $G\alpha_{q/z5}$ (SEQ ID NO: 1); (b) Figure 2, *C. elegans* $G\alpha_{q/z9}$ (SEQ ID NO: 2); (c) Figure 2, *C. elegans* $G\alpha_{q/s9}$ (SEQ ID NO: 3); (d) Figure 2, *C. elegans* $G\alpha_{q/s21}$ (SEQ ID NO: 4); (e) Figure 2, *C. elegans* $G\alpha_{q/i3(5)}$ (SEQ ID NO: 5); or (f) Figure 2, *D. melaongaster* $G\alpha_{q/zs}$ (SEQ ID NO: 41).

137. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the cell is an insect cell.

138. The process of any one of claims 116, 117, 118, 123, 124, 125, 126, or 127, wherein the cell is a mammalian cell.

139. The process of claim 138, wherein the cell is nonneuronal in origin.

140. The process of claim 139, wherein the nonneuronal cell is a COS-7 cell, 293 human embryonic kidney cell, a CHO cell, a NIH-3T3 cell, a mouse Y1 cell, or a LM(tk-) cell.

141. A process of screening a plurality of independent clones not known to include a clone encoding a mammalian G protein-coupled receptor, to identify and isolate a clone encoding a mammalian G protein-coupled receptor, which comprises:

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a plurality of independent clones with a ligand, under conditions permitting activation of a mammalian G protein-coupled receptor;

(b) determining whether the ligand activates the cells expressing the plurality of independent clones and the chimeric G protein; and if so

(c) isolating the single clone which expresses the mammalian G protein-coupled receptor activated by the ligand, so as to thereby identify any clone included in the

plurality of clones as encoding a mammalian G protein-coupled receptor.

142. A process of screening a plurality of independent clones not known to include a clone encoding a mammalian G protein-coupled receptor, to identify and isolate a clone encoding a mammalian G protein-coupled receptor, which comprises:

(a) contacting cells transfected with and expressing DNA encoding a chimeric G protein and expressing DNA encoding a plurality of independent clones with a ligand, under conditions permitting specific binding to a mammalian G protein-coupled receptor;

(b) determining whether the ligand specifically binds to the cells expressing the plurality of independent clones and the chimeric G protein; and if so

(c) isolating the single clone which expresses the mammalian G protein-coupled receptor which specifically binds to the ligand, so as to thereby identify any clone included in the plurality of clones as encoding a mammalian G protein-coupled receptor.

143. The process of claim 141 or 142, wherein the DNA encoding the plurality of independent clones is endogenous to the cell.

144. The process of claim 141 or 142, wherein the DNA encoding the plurality of independent clones is transfected into the cell.

145. The process of claim 141 or 142, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

146. The process of claim 141 or 142, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαz protein beginning with the C-terminal amino acid of such vertebrate Gαz protein, wherein such number equals the number of amino acids deleted.

147. The process of claim 141 or 142, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαs protein beginning with the C-terminal amino

acid of such vertebrate Gαs protein, wherein such number equals the number of amino acids deleted.

148. The process of claim 141 or 142, wherein the chimeric G protein comprises an invertebrate Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate Gαi3 protein beginning with the C-terminal amino acid of such vertebrate Gαi3 protein, wherein such number equals the number of amino acids deleted.

149. The process of claim 141 or 142, wherein the chimeric G protein comprises an *Caenorhabditis elegans* Gαq G protein from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

150. The process of 141 or 142, wherein the chimeric G protein comprises a *Drosophila melanogaster* Gαq G protein, a *Limulus polyphemus* Gαq G protein, a *Patinopecten yessoensis* Gαq G protein, a *Loligo forbesi* Gαq G protein, a *Homarus americanus* Gαq G protein, a *Lymnaea stagnalis* Gαq G protein, a *Geodia cydonium* Gαq G protein, or a *Dictyostelium discoideum* $G\alpha_4$ G

protein, from which at least five, but not more than twenty-one, contiguous amino acids beginning with the C-terminal amino acid have been deleted and replaced by a number of contiguous amino acids present in a vertebrate G protein beginning with the C-terminal amino acid of such vertebrate G protein, wherein such number equals the number of amino acids deleted.

151. The process of claim 141 or 142, wherein the chimeric G protein has an amino acid sequence substantially the same as the amino acid sequence shown in (a) Figure 2, *C. elegans* $G\alpha_{q/z5}$ (SEQ ID NO: 1); (b) Figure 2, *C. elegans* $G\alpha_{q/z9}$ (SEQ ID NO: 2); (c) Figure 2, *C. elegans* $G\alpha_{q/s9}$ (SEQ ID NO: 3); (d) Figure 2, *C. elegans* $G\alpha_{q/s21}$ (SEQ ID NO: 4); (e) Figure 2, *C. elegans* $G\alpha_{q/i3(5)}$ (SEQ ID NO: 5); or (f) Figure 2, *D. melaongaster* $G\alpha_{q/zs}$ (SEQ ID NO: 41).

152. The process of claim 141 or 142, wherein the cell is an insect cell.

153. The process of claim 141 or 142, wherein the cell is a mammalian cell.

154. The process of claim 153, wherein the cell is nonneuronal in origin.

155. The process of claim 154, wherein the nonneuronal cell is a COS-7 cell, 293 human embryonic kidney cell, a CHO cell, a NIH-3T3 cell, a mouse Y1 cell, or a LM(tk-) cell.